APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/032,156	12/21/2001	M. Amin Shokrollahi	019186-003800US	3575

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EXAMINER
FAN, CHIEH M

ART UNIT	PAPER NUMBER
2634	

DATE MAILED: 03/13/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

	Application No.	Applicant(s)
Office Action Summary	10/032,156	SHOKROLLAHI ET AL.
	Examiner	Art Unit
	Chieh M Fan	2634

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>21 December 2001</u> .

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-53</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) <u>36-49 and 51-53</u> is/are allowed.

6)☒ Claim(s) <u>1-8,15-17,26-30,32,33 and 50</u> is/are rejected.

7)☒ Claim(s) <u>9-14,18-25,31,34 and 35</u> is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>21 December 2001</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

    If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

        1.☐ Certified copies of the priority documents have been received.

        2.☐ Certified copies of the priority documents have been received in Application No. _____ .

        3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

    a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Specification

1.   The disclosure is objected to because of the following informalities:

a. "possibly on or more redundant symbols" in line 13 of page 15 should be changed to "possibly on <u>one</u> or more redundant symbols".

b. "static encoder 205" in lines 19 and 23 of page 17 should be "static encoder <u>210</u>".

c. "1025 in lines 1 and 2 of page 27 should be "1020".

d. "LDPC decoder 2005" in lines 5 and 6 should be "LDPC decoder <u>1205</u>".

e. "Hamming decoder 2010" in lines 6-7 should be "Hamming decoder <u>1210</u>".

f. The examiner cannot find the drawings associated with the description "(T)he result of the flow illustrated in Fig. 8 .." in lines 12-15 of page 34.

Appropriate correction is required.

Claim Objections

2.   Claims 2, 14, 23 and 34 are objected to because of the following informalities:

Regarding claim 2, "a communications channel" in line 2 should be "<u>the</u> communications channel".

Regarding claim 14, "2D – D – 1 >= K" in lines 1-2 should be "$2^D – D – 1 >= K$".

Regarding claim 23, "a communications channel" in line 2 should be "the

communications channel".

Regarding 34, "and a" in line 5 should be "and".

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3.   The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4.   Claims 5 and 29 rejected under 35 U.S.C. 112, first paragraph, as containing

subject matter which was not described in the specification in such a way as to enable

one skilled in the art to which it pertains, or with which it is most nearly connected, to

make and/or use the invention.

On page 36, line 4, the applicants indicated "the number of output symbols

collected should be at least $(1+\alpha)*K$."   The applicants never indicated that α may be a

negative number. Therefore, it appears that N should be always greater than the

number K of input symbols in the ordered set of input symbols

Claim Rejections - 35 USC § 102

5.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6.   Claims 1-3, 6, 7, 26, 27, 30, 32 and 50 are rejected under 35 U.S.C. 102(b) as

being anticipated by Wolf (US Patent 5,983,383).

Regarding claims 1, 27 and 50, Wolf teaches a method of encoding data for

transmission from a source to a destination over a communications channel, the method

comprising:

generating a plurality of redundant symbols from an ordered set of input symbols

to be transmitted (see 2 and 24 in Fig. 2); and

generating a plurality of output symbols from a combined set of symbols

including the input symbols and the redundant symbols (28, 30 in Fig. 2), wherein the

number of possible output symbols is much larger than the number of symbols in the

combined set of symbols (28 in Fig. 2 is a convolutional encoder which adds redundant

bits, the number of possible output symbols of 28 is therefore larger than the input

symbols) wherein at least one output symbol is generated from more than one symbol

in the combined set of symbols and from less than all of the symbols in the combined

set of symbols (28 in Fig. 2 receives data from the 1st interleave 26, which interleaves

more than one input symbol and one redundant symbols), such that the ordered set of

input symbols can be regenerated to a desired degree of accuracy from any

predetermined number, N, of the output symbols (108, 110, 112 in Fig. 5; as shown in

Fig. 5, the viterbi decoder 108 receives the output symbols from the 1st de-interleaver

106, which in turn receives a plurality of output symbols in order to de-interleave).

Regarding claim 2, the plurality of output symbols of Wolf are transmitted over a

communication channel (10, 12 in Fig. 1).

Regarding claim 3, Wolf teaches that the output symbols are stored in the

interleaver 30 in Fig. 2 (an interleaver stores its input data in rows and reads out the

data in columns).

Regarding claims 6 and 7, as shown in Fig. 4 of Wolf, the number R of the

redundant (i.e., parity) symbols varies according to the number K of input (i.e.,

information) symbols.

Regarding claim 26, Wolf teaches that the step of generating the plurality of

output symbols is performed using a convolutional encoder 28, and the step of

generating a plurality of redundant symbols is performed by a Reed-Solomon encoder

24 separated from the convolutional encoder.

Regarding claim 30, Wolf also teaches a transmit module (32 in Fig. 2) coupled

to the dynamic encoder (28, 30 in Fig. 2).

Regarding claim 32, Wolf also teaches a key generator ("code rate select" in Fig.

3) for the static encoder 924 in Fig. 2).

Claim Rejections - 35 USC § 103

7.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8.   Claims 4, 5, 15-17, 28 and 29 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Wolf (US Patent 5,983,383).

Regarding claims 4, 5, 28 and 29, Wolf teaches the claimed invention, see the

rationale applied to claims 1 and 27 above, but fails to specify whether the N is greater

or less than the number of input symbols in the ordered set of input symbols. However,

since both situations are claimed in claims, the claimed limitations appear to be only

design options.

Regarding 15-17, "a desired accuracy" is only a matter of design choice

depending on the user's need.

9.   Claims 8 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Wolf (US Patent 5,983,383) in view of Dillon et al. (US Patent 6,430,233).

Wolf teaches the claimed invention, see the rationale applied to claims 1 and 27

above, but fails to teach that the plurality of redundant symbols is generated according

to a LDPC code (Wolf teaches the plurality of redundant symbols is generated

according to a Reed-Solomon code). However, both LDPC code and Reed-Solomon

are well known and widely used in the art for forward error correction. Dillon et al.

teaches using a LDPC code or Reed-Solomon code as an error correction code (claim

47). Therefore, it would have been obvious to one of ordinary skill in the art at the time

the invention was made to generate the plurality of redundant symbols is generated

according to a LDPC code so as to improve the reliability of communication.

Allowable Subject Matter

10.   Claims 36-49 and 51-53 allowed.

Claims 36-44 and 51-53 are allowable over the prior art of record because the

prior art of record does not teach or suggest the limitation "if the step of regenerating at

least a subset of the symbols from the N output symbols does not regenerate the input

symbols to a desired degree of accuracy, regenerating at least some of un-regenerated

input symbols from the plurality of regenerated redundant symbols and the plurality of

regenerated input symbols".

Claims 45-49 are allowable over the prior art of record because the prior art of

record does not teach or suggest a dynamic decoder that, upon receiving at leas a

subset of the output symbols, decodes a subset of the symbols in the combined set

from the output symbols, the subset of the symbols in the combined set including a

plurality of decoded input symbols and a plurality of decoded redundant symbols, and a

static decoder that decodes at least some of undecoded input symbols, if any, from the

plurality of decoded redundant symbols.

11.   Claims 9-14, 18-25, 31, 34 and 35 are objected to as being dependent upon a

rejected base claim, but would be allowable if rewritten in independent form including all

of the limitations of the base claim and any intervening claims.
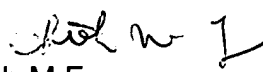
Conclusion

12.   The prior art made of record and not relied upon is considered pertinent to

applicant's disclosure. Matsushita (US Patent 5,608,738), Chethik (US Patent

5,432,787), Cideciyan et al. (US Patent 5,331,320), Luby (US Patent 6,307,487), Luby

(US Patent 6,320,520).

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Chieh M Fan whose telephone number is (703) 305-

0198. The examiner can normally be reached on Monday-Friday 8:00AM-5:30PM,

Alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Stephen Chin can be reached on (703) 305-4714. The fax phone numbers

for the organization where this application or proceeding is assigned are (703) 872-9314

for regular communications and (703) 872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or

proceeding should be directed to the receptionist whose telephone number is (703) 305-

4750.

Chieh M Fan
Examiner
Art Unit 2634

cmf
March 9, 2003